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Country Roads.

THIS is the season when country roads make one of the staple subjects of complaint by the persons who have fled from the stifling heats of the city. These visitors, on recreation bent, find few inviting foot-paths when they wish to walk, and after returning from their first attempt to drive they usually write a letter to some newspaper complaining that the roads are stony or shadeless or dusty or muddy. It would seem that rural neighborhoods which lack the spirit or enterprise to keep good roads for their own comfort and profit would care little for the displeasure of transient visitors, but really the money brought into many country communities by summer visitors forms a considerable item in the sum total of their earnings for the year. Special attractions in the way of beautiful scenery or health-giving springs or pleasant lakes make a capital which often yields a remunerative income, and if all the attractions of perfect roads were realized it might be found that the money used in securing them would prove a most profitable investment by serving as an additional inducement to turn the tide of summer travel in their direction.

It is easy enough, however, to exhort persons to improve their highways, but it should always be remembered that special training and experience are required for the construction of a satisfactory road. Certain it is that a group of farmers who gather once a year to repair the roads can accomplish very little that is effective in this direction, and even when repairs have been made properly, and the road is left for an entire season to take care of itself, it will be as bad as ever when the annual mending-time comes round. Every year it is becoming more generally understood, as we are glad to know, that the roads must be made well in the beginning if they are to be kept well thereafter, and that slight repairs made during the year as they are needed are altogether preferable to the practice of repairing once for all. When roads are once well drained and well constructed the money which is annually expended upon them under the old system, with no satisfactory result, would amply suffice to keep them in excellent condition if it was entrusted to some competent engineer in charge of the entire district. Many of the states have already adopted this township plan, under which all the road repairs are entrusted to a selected officer, and this is a marked improvement upon the old district plan, where the farmers worked out their tax. The necessity, too, of adequate training in this matter is so far recognized that a course of study in road-making forms a part of the curriculum of several of our agricultural colleges and some other universities. The invention of road-machines has also proved of great advantage in this respect, and although the material used is too often the scrapings of mud and soil from the gutters instead of gravel or pounded stone, nevertheless the roads repaired by machinery are usually much superior to those worked on the old system. Some of the states, too, have passed enactments by which the repairs of the main thoroughfares are provided for by a general tax, while only the cross-roads and by-roads are left to be cared for by the communities through which they pass, and the result of it all is that the roads in the eastern part at least of the United States are materially better in every respect than they have been in former years.

But even a good road—that is, a road which furnishes a smooth wheelway—may be an unattractive one, and it is worth while once more to call attention to the treatment of the road borders. Rural improvement societies, which have planted road-sides with shade trees, have done much in various parts of the country to mitigate the heat and dust which make driving unpleasant. Of course, it is not always advisable to plant a formal line of trees along winding roads and through a hilly country, but, as a rule, it will be found that trees however planted are better than none. We know of few instances, however, where systematic efforts have been made to preserve the growth of shrubs and wild flowers which spring up of their own accord. We have in a former number called attention to the work of the gardener of a great estate not far from this city who has thoughtfully planted the seeds of wild flowers along the bordering shrubs, which have been allowed to remain and fringe the road-side. Where one can see Blood-root, Bluets and Lupin with Cone Flowers, Painted Cup and Golden Rod and an increasing number of Ferns and Mosses embroidering the ledges of road-side thickets the way can never be uninteresting from early spring till late autumn, and even in winter, where the berries of the Black Alder and the heps of Wild Roses are left to glimmer among the soft tints of the leafless twigs of the shrubbery, the eye finds something to delight in.

Too often, however, all efforts at improving the wayside are made with the grubbing hoe and brush hook. The tidy farmer does well to cut down the brush along his fences, which otherwise would keep constantly encroaching upon his land, but this practice is not a virtue when it is extended to the fences which border the highway. It is true that in smooth and level countries where the wheelway is bordered by a greensward which is connected naturally and under open fences with the grass of the meadows and pastures, there is propriety in keeping down all other growth; but in stony and hilly regions where the bushes are cut away and nothing is left but raw ground and stumps the effect is unsightly. No formal planting can be more beautiful than the spontaneous growth of Nature's furnishing where the roads are lined with thickets of Black Haw and Cockspur Thorn, Sumac and Hazel Nut, with the Wild Grape clambering over the stone walls and festoons of Bitter Sweet swinging from the trees overhead, and Clematis and Ground Nut and Moonseed rioting over the shrubbery. No park-planting can excel such masses of foliage, and from the time when the June-berry and Dogwood and Wild Plum blossom in the spring, with Viburnum and Elder, Honeysuckles and Roses following in close succession, until the yellow Witch Hazel blossoms brighten up the border in late autumn, there is no lack of flowering shrubs. All that is needed to produce the most beautiful effects in this line is to allow these wild places to clothe themselves, to restrain the too rampant growth of the

stronger plants when they become too aggressive, and add an occasional touch, perhaps by setting some low-growing shrubs like Red Root and Sweet Fern on the edges of shrub belt, or planting some wild flowers in suitable openings.

Farmers often complain of the rates charged by transportation companies, but it would be easy to demonstrate that the carriage of farm products by rail and steamer, all combined, costs much less than the hauling of these products over country roads from the farm to the nearest railway station. This is not the place to enforce the argument for good roads by showing how much more rapidly and cheaply this hauling could be done if the roads were all good and in good condition. But, certainly, it is worth while to invite the attention of country landholders to the value of attractive roads. The first impression which a visitor receives of any region comes through its roads, and as he leaves, his last experience is on the road over which he is driven to the station. Every day, when he is not shut within doors, he makes use of roads and paths, and, although he may not realize the fact, a large portion of his pleasure or discomfort is due to their influence. Good roads pay by reducing bills for repairs of wagons and carriages, by saving time, by economizing horse power and in many another direction. The absolute money value of attractive roads to any country community is just as real and positive. They give an added value to every acre of land in the districts which they traverse.

The people of California seem inclined to resent the statement of Major Powell that "the forests of the upper regions are not advantageous to the people of the valleys who depend on the streams for the fertilization of their farms." *The Century Magazine* for August publishes a letter from Mr. Abbot Kinney, who states from personal observation that in many cases the clearing away of the mountain forests has caused torrents in California which make the bottom-lands unsafe and he corroborates his experience by a number of references to leading authorities to show that the Major's theory is at variance with all the known facts of the case. A strong article, too, lately appeared in the *Alta California*, setting forth the dangers which threaten the forests of the western portion of the continent and expressing the views of all who are familiar with the forest-problems of that region. We quote a portion of this article which refers to forest-fires:

"Forest-arson is already in progress in California. The smoke from burning forests is beginning to soften the sunshine. It hangs over the waters of the bay and gives to all landscapes in every direction the soft and fine effects peculiar to the Indian summer in the east. These effects are purchased at too great cost, however. Thousands of acres of the noblest timber in the world will be sacrificed by fire between now and the first rains next fall. As usual, these forest-fires begin with the driving of sheep and goats into the mountains. In the coniferous forests there is not much pasture for these animals. The ground is covered by a carpet of the fallen needles and resinous cones. Under the Pines the Azalea grows. The sheep browse it, but it poisons them. Fire kills the timber, and when the carpet of cones and needles is destroyed some pasture will grow for a time. Fire also removes the Azalea. Is it at all remarkable, therefore, that fire is left in the track of the shepherd and his sheep? California mountaineers, who have practical knowledge on the subject, express their surprise at the views of Major Powell, of the United States Geological Survey, upon this subject, published recently in *The Century*. He strongly urges the good effect upon the forests of running sheep in the Sierras, and announces it as a prime method for preserving timber! A summer in the Sierras would work a change in his opinions."

The story of the wasting of the forests of the Sierra Nevada cannot be repeated too often; nor is it easy to overestimate the injury which Major Powell's utterances about forests in general are likely to work, coming as they do from the highest scientific officer of the Government. Positive opinions from such a source are apt to receive attention, especially when they appeal to selfish interests; and Major Powell's recent remarks about our forests must bring great comfort to all the army of men who live illegally in one way or another on the forests of the public domain. As long as the officer, whose duty it is to furnish scientific information to the Government, declares that the forests of the western mountains are an injury to the country, timber thieves will continue to cut and shepherds will continue to burn these forests with new energy and with diminished dread of punishment.

White Park, Concord, New Hampshire.

The capital of New Hampshire is a pleasant city of some 15,000 inhabitants. Its main street lies near the bank of the River Merrimac, and its residence streets stretch along the slopes of hills which rise irregularly west of the stream. Beyond the older streets, but surrounded by modern ways, is a small tract of land which is in part so precipitous and in part so swampy that all the new roads have avoided it. On this rough land is a fine growth of large trees of many sorts, and, although it lies only half a mile from the centre of the town, many of the most interesting New England wild flowers bloom in the shelter of its woods and hollows.

This tract of about twenty-five acres has been presented to the city of Concord, and is called White Park for the donor. A commission of well known citizens has been placed in charge of the work of fitting the ground for the use and enjoyment of the people, and they have wisely begun their labors by devising and adopting the general plan which is reproduced on page 395.

The Commission intends to make the park a place of quiet resort for people who cannot take the time or who have not the strength to go often to find refreshment in the open country. No carriages are to be admitted, not only because the acreage is small and the slopes steep, but also because it seems unfair to injure the park for the use of children and pedestrians while innumerable pleasant country-drives are close at hand. No elaborate gardening will be admitted, not only because it is costly, but also because it would be incongruous. Every city of the new West may have its carpet-bed "park" if it so wishes, but Concord proposes to seize her opportunity to provide for her citizens and their posterity something very much more valuable. She will set aside and preserve, for the enjoyment of all orderly townspeople, a typical, strikingly beautiful and very easily accessible bit of New England landscape. Would that every American city and town might thus save for its citizens some characteristic portion of its neighboring country! We should then possess public places which would exhibit something more refreshing than a monotony of clipped grass and scattered flower-beds.

The plan adopted by the Commission provides for the enhancement of the natural beauty of the park by spreading water in the lowland where nature made a marsh, by making grassy glades in two or three hollow parts where nature grew Alders and Birches, by planting a thicket of Mountain Laurel here and opening a vista to the Merrimac there; and then the plan leads paths in such directions and by such routes as will best display the beauty of the place while injuring it least. In the opinion of the Concord Commission, a path, far from being a chief beauty of a park, is only an instrument by means of which it is possible for large numbers of people to pass through the midst of beautiful landscape without seriously injuring it.

The variety of limited scenery which White Park will present when it is finished is great. Just within the main gate (at the end of the plan on the left) will be a level of green sward, bounded on three sides by rising banks, from which hang thick woods of deciduous trees. At one end the banks draw close together, and here is a deeply shaded dell, from the head of which a path climbs by steps to the street. Two other paths lead up from the green, by little hollows in the skirting bank, to a plateau where Pitch Pines stand in open order, and the ground is carpeted with their needles. A steep-sided, curved and densely wooded ridge in turn bounds this plateau, and beyond it, and nestled in the curve at its base, is a tiny pond, fed by strong springs, and overhung by tall White Pines. Its waters overflow, by way of a steep and stony channel, into a much larger pond, with shores but little raised above the water, which occupies the southern third of a long level, through which a slow brook meanders. The shore of this pond, and all the flat land near the brook, is scatteringly wooded with large deciduous trees. Paths reach little beaches on the shore at several points. Beyond the head of the pond a path leads to a "shelter" on a knoll in the midst of deep

woods, and thence by a sharp ascent to a high point on the very edge of the park, whence a pretty view will be had of the pond at one's feet and the Merrimac Valley beyond, with the state-house dome in the middle distance and near the middle of the picture. All things considered, Concord is in a fair way to possess one of the most charming small parks in America.

Why are gifts like this of Mrs. White to Concord not more common? Can any more valuable present to posterity be imagined? Perhaps they may be commoner when it comes to be known that there are now several park commissioners in this country who do *not* consider it their first duty to destroy the beauty which nature provides. Real landscape art is nothing if it is not broad, simple and conservative of natural beauty. It is elaborate and gardenesque only in special circumstances. Its old name of "landscape-gardening" must be discarded at once, if the definition in the new Century Dictionary is correct. Landscape art does not consist in arranging trees, shrubs, borders, lawns, ponds, bridges, fountains, paths or any other things "so as to produce a picturesque effect." It is rather the fitting of landscape to human use and enjoyment in such manner as may be most appropriate and most beautiful in any given spot or region. When this is generally understood by the public and practiced by the profession, parks and country-seats will be so designed as to be not only well arranged and beautiful, but beautiful in some distinctive and characteristic way, as is White Park at Concord.

The Alleghanies of Virginia in June.—II.

THE long, low colonial house at Eggleston's Springs, where we spent the night after leaving Salt Pond Mountain, stands in the centre of a wide, shady meadow, on the edge of the swift, muddy New River, and a few hundred yards below it are the fine limestone cliffs that rise up perpendicularly out of the water, several hundred feet high. The climb over a rough, stony trail to the top of this cliff is well repaid by the view of the curving stream and its beautiful, wooded banks.

On the highest ledge of the great buttresses grows the rare *Pachystima Canbyi*, a low evergreen shrub, only a few inches high, with narrow, serrulate leaves and curious yellowish roots. There is very little of it on the ledges; most of the plants, perhaps fortunately for their future, are quite inaccessible. It is in very select society, too, up there on its rock. *Berberis Canadensis* is close by on the edge of the precipice, so is *Rhus Canadensis;* and on the shady side of the cliffs, the Walking Leaf (*Camptosorus rhizophyllus*) "walks" over the mossy rocks, and quite a little company of Spleenworts (*Asplenium Ruta-muraria, A. parvulum* and *A. Trichomanes*), grow close together under an overhanging boulder. Two pretty little white-flowered plants, *Arabis lyrata* and *Draba ramosissima*, grow on the cliffs, and *Clematis Viorna*, the Leather Flower, was in both flower and fruit. The long vines were covered with the dark reddish purple bells and the round, fluffy balls of the plumose-tailed fruit, and they climb over the bushes and hot rocks, where all down the face of one of the cliffs, in the blazing sun, the dainty, frail-looking little *Arenaria Michauxii* blooms undisturbed, and the pale, stiff *Pellæa atropurpurea*, the Cliff-brake, grows out of the many cracks. *Asclepias variegata* was just beginning to open its compact umbels of white along the path, bordered by dense clumps of *Rosa humilis* and little straggling patches of *Pentstemon pubescens*, where the air was heavy with the fragrance of innumerable wild Grape vines.

Our next mountain trip was from Buchanan, on the beautiful James River, to the Peaks of Otter, in the Blue Ridge, Bedford County, and beyond the assurance that there was a hotel near the Peaks, we could get no information from the natives at the station. It had rained heavily while we were in the train coming from Natural Bridge, the dust was laid, and from the start the scenery was finer, the forests older and in better condition, and last, but not least, the roads smooth and level in comparison with those on Salt Pond Mountain.

The picturesque Scrub Pine (*Pinus inops*), growing close to the road and scattered over the hills, made a delicious fragrance through the moist woods. The pretty Chinquapin (*Castanea pumila*) was in full bloom, and at a turn in the road, on the edge of the dense jungle, was a great clump of it against a background of the large, shiny leaves of the Black Jack Oak (*Quercus nigra*) and tall, overhanging branches of the Sorrel-Tree (*Oxydendrum arboreum*). The latter is almost a small tree in some of the thickets, its long finger-like racemes then covered with little round buds just ready to burst into bloom. The most striking plant on the first ascent is the Goats-beard (*Spiræa Aruncus*), with tall, compound panicles of pure white, feathery flowers. Big bunches of *Tephrosia Virginiana* fill the spaces between the bushes with pretty pink and yellow spikes, and the Fire Pink (*Silene Virginica*) makes a splendid show, for anything more brilliant than its bright crimson stars would be hard to imagine. Two golden-yellow flowers, an Evening Primrose (*Œnothera glauca*) and *Coreopsis verticillata*, were abundant on the road embankment, where the little dark red-flowered *Galium latifolium*, the graceful pink clusters of *Asclepias quadrifolia* and the stiff, white-flowered *Euphorbia corollata* grow side by side.

A little further up on this same enbankment we found the wonderfully pretty little relative of Shortia, *Galax aphylla*. The glossy, heart-shaped leaves are a bright light green, closely covering the ground, and row after row of the tall, stiff spikes stand up all through the underbrush. It had been just ready to bloom ten days earlier on Salt Pond Mountain, but here it was at its height, for the tall stems were covered to their tips with the beautiful little white flowers. When we reached the top of the first hill we saw for the first time *Kalmia latifolia* in all its glory of bright pink buds and great round bunches of white flowers. We drove up through tall hedges of it, the straggly, Japanese-looking shrubs filling the swamp with patches of white against the light green young woods beyond; and all around the edges of the marsh we found *Oakesia puberula, Anemone trifolia* and *Pogonia verticillata*, all three already in fruit, and on the top of the hill *Parthenium integrifolium* and *Amianthemum muscætoxicum*. This latter plant, belonging to the Lily family, has tall spikes of flowers, and was so abundant that the whole swamp was a waving mass of white, while over everything twined and twisted the large, pointed leaved vines of the Wild Jam-root (*Dioscorea villosa*).

The road-sides are bordered by splendid round-topped Chestnuts, *Magnolia acuminata*, in plenty, and here and there a few Hemlocks along the water-courses. Some of the Oaks are magnificent, and by far the finest of the larger trees on the mountain.

The road led under the brow of a long ridge for a couple of miles, and at every turn the view grew grander and more varied. It was eight o'clock before we reached the hollow between the two peaks, where we supposed the hotel was. Our colored drivers, who, notwithstanding their protests to the contrary, knew absolutely nothing about road or mountain, were entirely at sea till an obliging farmer informed us that the house was on the top of the mountain, and had been there for the last twenty-five years, and that we could only drive a few hundred yards further, after which we should have to walk up 700 yards or so to the summit. The road was so steep that we all left the wagons and walked in the gathering dusk to the small log hut, where the horses were left, then in the pitch darkness tried to keep in the narrow stony trail, and at ten o'clock, a tired, bruised party, reached the "hotel," a small log cabin and a tiny kitchen, perched between two huge boulders on the windy summit. Mr. Rosser, the proprietor, an old negro servant, and his daughter, the cook, some dogs and chickens, and a flock of wild white Angora goats, are the only inhabitants of this lonely eyrie, from which in all directions we could see, shining out of the darkness far down in the valleys below, the lights of Roanoke, Lynchburg, Liberty and those of the many smaller settlements grouped around them.

The accommodations were not luxurious, but we were passably comfortable, and when called at five o'clock were ready for a day's hard climbing. The sunrise from behind the misty Blue Ridge was a sober one that morning, but the view was magnificent. Range after range of the forest-clad mountains of West Virginia lay to the west, and at our feet a few wooded valleys and foot-hills, and then the wide fertile plain that stretches south through Virginia and North Carolina toward the Atlantic.

In the cracks of the rocks and among the loose stones all about us, but only on the very top of the peak, grew luxuriantly *Dicentra eximia*, the long, drooping racemes of curious pale pink flowers closely resembling those of the cultivated Bleeding Heart. The two ornamental shrubs of the summit, and the only ones, were *Rhododendron Catawbiense*, its big, deep pink bells bright and fresh in the morning light, and the American Mountain Ash (*Prunus Americana*), a very striking little tree, with wide, flat cymes of creamy white flowers. *Diervilla trifida* grows quite bushy not far from the top, and a projecting group of boulders, "The Needles," is carpeted with the small *Paronychia argyrocoma* in dense silvery looking mats. The Wild Columbine (*Aquilegia Canadensis*) was hanging out its bright red and yellow bells up there twice the size that they attain in the valleys. We found *Lilium Grayi* all through the woods, but we were too early for the flowers, as we were too late for those of *Clematis verticillaris* that grew further down.

Asarum arifolium was growing in a damp spot near the

small spring below the summit, and close by on the rocks were pretty little clumps of the delicate bluish *Houstonia purpurea*, var. *longifolia*, and along the road below were great masses of the showy Purple-Flowering Raspberry (*Rubus odoratus*).

The twelve-mile drive on the return to Buchanan was, if possible, more beautiful than the ascent, and when the valley was reached we were unanimously in favor of returning at some later season of the year, for the promise of autumn flowers was enchanting. It would be hard to find anywhere a spring trip offering more beautiful and varied scenery, nor a more easily accessible one. Along the valleys the railroad companies are putting up everywhere charming little "Queen Anne" inns, in which the accommodations and fare leave little to be desired, though off the beaten track, roughing it must be accepted with good grace. The trains are marvels of unpunctuality, and time down there is no consideration whatsoever; but these defects were made up for by the politeness and attention we received from the trainmen and their evident desire to make every one as comfortable as possible.

New York. *Anna M. Vail.*

Earliness With Unripe Seed.

THERE seems to be a fair amount of evidence to prove that seeds from immature fruit will give a product requiring less than the usual time to ripen, and that the earliness thus gained can be increased by continuing the selection. The strain of Tomatoes from green seed, mentioned by Dr. Sturtevant in his timely notice of the subject in a recent number of Garden and Forest (page 355) is still grown in the garden of the Indiana Experiment Station, and with increasing interest. The present season is the fifth generation. A report on the result of this study will eventually be published. Some information gathered from this and other attempts to investigate the subject of the relation of unripe seeds to the development of divergent characters in the product makes clear some points which it will be well to bear in mind in any attempt to apply such a method to the production of early varieties.

It is not the slightly unripe seeds that give a noticeable increase in earliness, but very unripe seeds, gathered from fruit scarcely of full size and still very green. Such seeds do not weigh more than two-thirds as much as those fully ripe. They germinate readily, but the plantlets lack constitutional vigor and are more easily affected by retarding or harmful influences. If they can be brought through the early period of growth and become well established and the foliage or fruit is not attacked by rots or blights, the grower will usually be rewarded by an earlier and more abundant crop of slightly smaller and less firm fruit. These characters will be more strongly emphasized in subsequent years by continuous seed propagation.

In the observations so far made, it has been found that the plant as well as the fruit tends to early ripeness, and so the period of fruitfulness—that is, the time between the first and the last ripe fruit—is much shortened.

With the increase in the amount of fruit there is also a corresponding decrease in the size of the vegetative parts of the plant—that is, the stems and foliage. A Tomato plant grown from green seed in the fourth generation was found to bear three and a half times as much fruit as tops—that is, stems and leaves together—while a similar plant from ripe seed had but one and an eighth times as much fruit as tops.

It therefore follows logically that while earliness may be considered as a usual condition in all crops from unripe seed, an increase in the amount of the crop only occurs when the true fruit is the part harvested, as in Tomatoes and Peas, and a decrease in the amount of the crop occurs when any part besides the fruit is harvested, as in Turnips and Potatoes.

Whether any method can be found to counteract the enfeebling of the plant and yet preserve earliness remains to be seen.

La Fayette, Ind. *J. C. Arthur.*

Plant Notes.

Tecoma grandiflora.

THE figure of *Tecoma grandiflora* on page 393 is from a photograph of a plant grown in a pot in a greenhouse and exhibited at the last (June) Rose Show of the Massachusetts Horticultural Society by Mr. James H. Comley, gardener to Mrs. F. B. Hayes, of Lexington, Massachusetts. Mr. Comley states that he received the original plant, without a name, from Mr. John Cadness, of Flushing, New York, some six or seven years ago. For the last five years the plant has been growing in the open air at Lexington without any protection except that afforded by a stone wall, against which it is planted, and by some surrounding shrubbery, and it seems to be almost as hardy as our native Trumpet Creeper (*T. radicans*), which is its near ally. It blooms freely every year, beginning early in August, and continuing to produce flowers for six or eight weeks, or until checked by frosts. Even when the whole plant is cut back to near the ground a profusion of flowers is produced on the strong, new shoots the first year.

Our figure represents a plant grown from a hard, or ripe, wood cutting, taken from the open-air plant in the autumn of 1889, and therefore about eight months old when exhibited. It is undoubtedly *T. grandiflora*, a Chinese species, which has also been introduced from Japan, where it appears to be known only in cultivation. It was introduced into England in the early part of this century, and in 1811 a figure was given in the *Botanical Magazine* (t. 1398) under the name of *Bignonia grandiflora*.

T. grandiflora is a climbing plant, like *T. radicans*, although it does not appear to grow so rampantly or to produce climbing rootlets on the stems so freely as the latter. The seven to thirteen ovate, pointed leaflets composing each leaf are of a lighter green and more coarsely toothed than those of *T. radicans*, which also differ in being more or less pubescent beneath. Instead of being produced in short terminal bunches at the ends of the branches, the flowers of *T. grandiflora* form large spreading panicles. The young calyx-covered flower-buds gradually taper to a point, and are noticeably five-angled, instead of being rounded and terminating abruptly in a small point, as in our common species. The magnificent bell-shaped flowers are from two to three inches deep, while the wide spreading mouths average three inches across. They are of a bright, light orange within the tube, orange-red with darker streaks on the outer spreading portion, while on the outside they are a soft salmon-yellow. Altogether the colors are much more pure and rich than those of the native flowers.

It does not seem to have been generally known, in this country at least, that this Tecoma would flower at so early an age, and therefore it has been suggested that the plant illustrated represents a specially precocious strain or variety. Indeed, it was exhibited under the provisional name of *T. præcox superba*. It is not improbable, however, that any plant of the species when treated in the same way would bloom as early. A plant received from Veitch last year is now flowering in the Arnold Arboretum. Mr. Parsons, of Flushing, who prefers to propagate it by grafting on *T. radicans*, has a plant in a three-inch pot which was grafted last winter and has just now finished blooming.

As already shown, this beautiful Tecoma is well adopted for forcing, and it may be propagated by hard or soft wood cuttings or from pieces of the root. For pot or out-door culture the plant may be very easily trained in a dwarf, bushy form.

Like many other exotics this was grown as a greenhouse plant when first introduced into cultivation in Europe, and it may be said to flower most freely when forced by artificial heat.

The plant shown in the figure is now producing flower-buds on new shoots which have been thrown out.

The Virginia Creeper.—This luxuriant climber is the best substitute we have for the English Ivy in cold climates where *Ampelopsis tricuspidata* is not hardy. But those who plant this vine with the expectation that it will cling to brick or stone walls are likely to be disappointed unless they select the variety with much care. The fact that an individual vine of this plant clings tenaciously to the trunk of a tree is no sure indication that it will attach itself to a wall. The tendrils on different plants vary much in their structure. On some they are much like those of the Grape, coiling about objects with which they come in contact, but little branched and producing no sponge-like disks at their extremities. Such vines will climb up the trunks of trees having rough bark, but they are

Fig. 50.—Tecoma grandiflora.—See page 302.

unable to attach themselves to walls. In another variety the tendrils branch into several divisions, each of which is terminated by a flat, sponge-like disk that unites itself with considerable tenacity to hard and comparatively smooth surfaces.

On the grounds of the University of Wisconsin the Virginia Creeper is much at home, coming up spontaneously about the whole campus. Attempts have been made to train it over the walls of the stone buildings, but these have been successful only in a few instances, where the variety was the one bearing the branched and disk-bearing tendrils above described. One variety seems especially well suited to the purpose, the foliage being very dense, the tendrils uniting themselves firmly and

the younger leaves having an attractive purplish tint. The tendrils on different seedling plants exhibit all forms of variation between the grape-like ones and the much-branched, disk-bearing ones.

Nurserymen would do well to propagate varieties with especial reference to their climbing properties, the density and shade of their foliage, and the quality of retaining their leaves after they have assumed their brilliant autumnal hue.

University of Wisconsin, Madison. *E. S. Goff.*

Iris Gatesii.—This new Iris, for which we are indebted to the energy and enterprise of Herr Max Leichtlin, has flowered lately in a few collections in Europe. It is larger and more attractive even than *I. Susiana*, hitherto considered the king of the genus. Max Leichtlin is reported to have said of *I. Gatesii* that it has "the most aristocratic appearance of any flower that has ever passed through his hands." Professor Michael Foster, the high priest of the Iris cult, described it last year in the following words: "Imagine a flower often very much larger than *I. Susiana*, of a delicate light gray hue, resulting from minute dots and delicate veins of a rich purple on a creamy white ground, or at times of a pure light sky blue, marked with deeper veins, and at the same time of peculiar grace and form." The plant is a native of Armenia, and requires the same treatment as *I. Susiana*, to which it is closely affined. It was named after the Rev. T. F. Gates, of the American Mission at Mardin. A figure of it from a plant flowered by Max Leichtlin has lately been published in the *Gardeners' Chronicle*.

I learn from Mr. De Graaf, of Leiden, that to succeed with *I. Susiana* and its allies the treatment must be more liberal than is usually afforded. Mr. De Graaf grows these plants by the thousand, and treats them exactly as he treats Tulips and Crocuses—*i. e.*, lifts them and stores them dry for the winter, and replants again in early spring in rich soil in open beds. Those who have tried the dry frame treatment for this section of Irises should try also that recommended, and, moreover, proved most successful, by Mr. De Graaf.

Kew. *W.*

Cultural Department.

Notes on American Plants.

ONE of our most showy biennials which blooms the last of July is the *Sabbatia chloroides*, a species of the American Centaury. The whole plant is somewhat slender, seldom over eighteen inches high, with a few not large, oblong-lanceolate leaves. The flowers are single at the extremities of a few slender peduncles about two inches wide and rose colored. They open in the middle of the day and close at night. The plant is often bent down at time of flowering, owing to its slender stems. It inhabits the "borders of brackish ponds" from New England southward, and it seems to prefer a moist, sandy soil on the margin of some pond or stream. When once established in a suitable locality it would no doubt continue from year to year and it is surely one of our most desirable natives.

Baptisia tinctoria (Wild Indigo), a herbaceous perennial, two to three feet high, with many spreading leafy branches bearing numerous light yellow flowers half an inch long near the ends, is a useful plant in many places, and it flowers about the middle of July. The three oval leaflets are about the size of those of the White Clover and much resemble them. It thrives on the poorest sandy plain-land, along the borders of woods or in open fields. Its foliage alone is worth the trouble of growing it, and when once established it seems to require little or no attention.

Calochortus macrocarpus, one of the later flowering species of the Butterfly Tulips, is a plant in greater demand among European dealers than most of this genus. Its large, showy, lightish purple flowers, more than two inches wide, are hardly excelled by any other species. But in our light, sandy soil and climate it is almost a total failure. The plants in early spring showed much vigor and sent up strong flowering stems, but before the buds were half grown the leaves died and only a few flowers ever opened. Perhaps a heavier soil would suit it better.

Cooperia is a genus belonging to the Amaryllis family, of which we have received three species from southern Texas. They much resemble some of the species of Zephyranthes, and might easily be taken for them. The plants come from a spherical, medium-sized bulb, have long and narrow grass-like leaves, and naked scapes about a foot high which bear a single white or pale rose flower. *Cooperia pedunculata* is the largest and strongest species and the first to flower by more than a week. Its more numerous leaves are wider than in either of the others and the plant seems the most desirable of the three. *C. Drummondii* and another called *C. Oberwetteri* are smaller, with narrower and more slender leaves and smaller flowers, coming into bloom about the same time, ten or fifteen days later than the first. Like most bulbous plants from the south they should be wintered in dry sand in a cellar.

Zephyranthes Texana, from southern Texas, has a reddish yellow flower with darker stripes, nearly an inch wide. The outside is still darker. Its foliage is very scant and at time of flowering there is little but the almost naked scape and flower to be seen above ground. Its height is hardly eight inches. The flowers last about two days.

Nemastylis tenuis is a showy little species from Mexico. Here in our northern climate it attains a height of only five inches, but it bears a bright yellow flower, with a slightly darker centre, an inch wide. The leaf is small and not conspicuous, and about all there is visible is the flower and its slender stem. The bulbs are small, half an inch or thereabouts in diameter, and covered with thick coating, to protect them from prolonged drought.

One of our most charming little natives at this season is *Talinum teretifolium*, a low, leafy-stemmed plant, with a peduncle about five inches long bearing an ample cyme of pink or rose-purple flowers over half an inch wide. It acts like an annual, but of this I am not sure. At all events, it flowers from seed the first year, and plants that bloomed last season did not come up this; but the open winter might have killed them. It seems to do best in shade.

The Marsh St. John's Wort (*Elodes Virginica*), with its pink or flesh colored flowers and numerous oblong-ovate clasping leaves, makes a pretty garden plant, now in flower. Its height is about fifteen inches, branching near the top. Its flowers are in small clusters and are about half an inch broad. It is a useful plant for the artificial bog, or it thrives well in any fine loamy soil in the shade or sun.

Asclepias verticillata (Whorled Milkweed) comes into flower the latter part of July. Its height is about fifteen inches, and its very numerous narrow leaves, which are in whorls at regular intervals along the stem, are about two inches long, and about six in a whorl. The flowers are nearly white, in several small umbels at and near the summit of the simple stem. It is an attractive, hardy perennial, easy to grow, and thrives in shade or sun.

The Wild Senna (*Cassia Marilandica*), which flowers here about August 1st, is one of our most valuable native perennials—a member of the Pulse family. Strong roots send up several stout, but simple, leafy stems, three or four feet high and bearing near and at the summit numerous lateral racemes of yellow flowers. Its foliage is fine from the time it matures until frost, and its flowers are also very pretty. It is not partial as to soil, but it will do well in any ordinary garden soil, and may be planted in either spring or autumn.

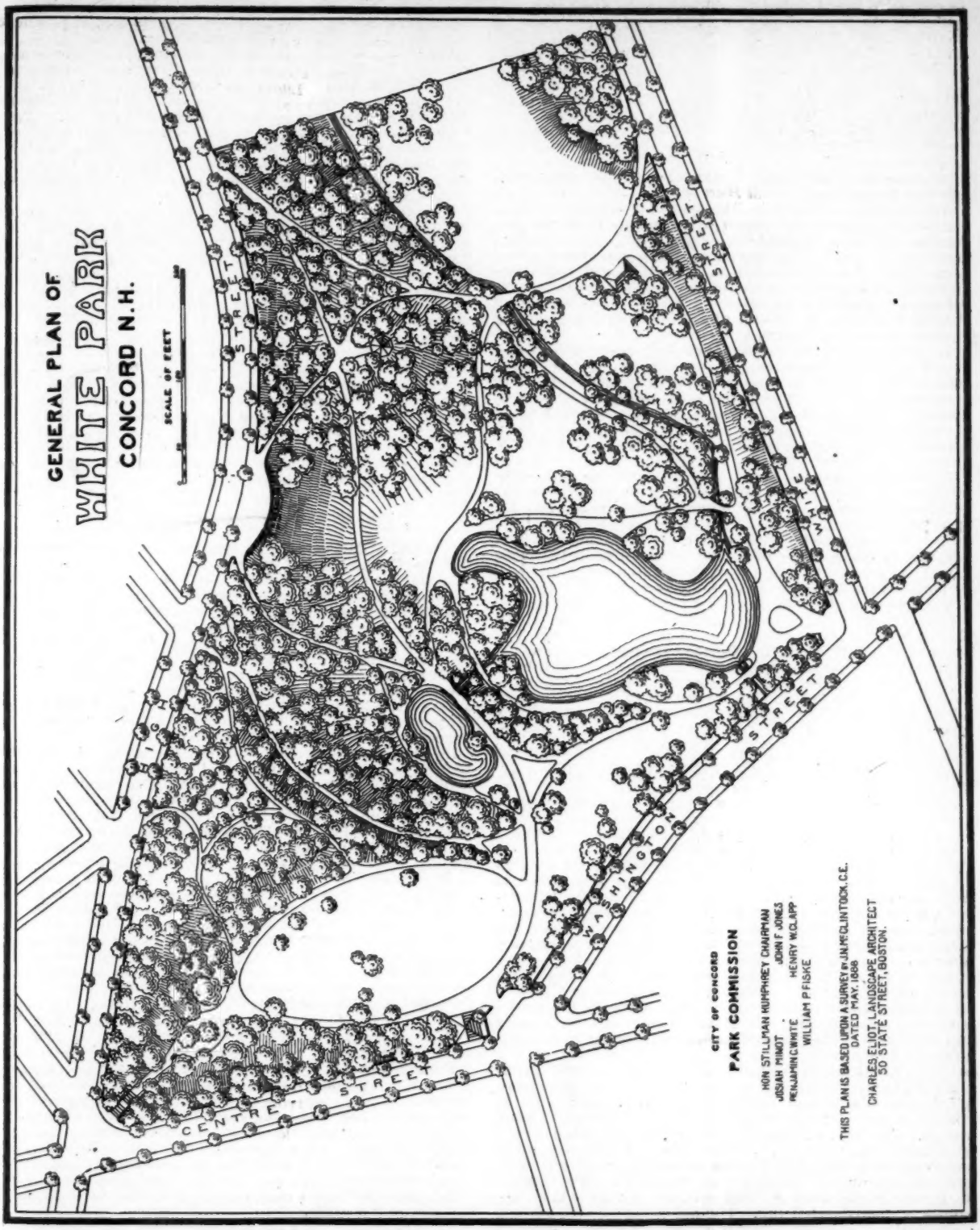
Tigridia Pringlei (see vol. i., p. 389, Fig. 61) prefers a heavy soil—a clay loam—to that of light sand with little or no clay; and this seems to be the case with most Tigridias we have tried. It has greatly improved in the three seasons of cultivation, the old bulbs being more than double their size when first gathered, and they bear larger and richer colored flowers. In one respect it is quite unlike most of the species common in cultivation, and that is, it is not much inclined to increase by the division of its bulbs. This season, in the light soil where we set it, the plants are hardly two-thirds as tall and the flowers are fewer and smaller.

Southwick, Mass. *F. H. Horsford.*

Rational Pruning of the Raspberry.

THE Raspberry-plant is a sort of compromise between a perennial herb and a shrub. Its stems are woody, but instead of living on from year to year, and bearing an indefinite number of crops like the Currant, it lives but about a year and a half, and, like a multitude of other plants, perishes after maturing its seed, while its roots live on indefinitely. Like many of the herbs, the stems make a very rapid growth until they have attained their normal stature, when, in common with their branches, they terminate in a cluster of flowers, followed in due time by the fruit. Such would be the case, at all events, but for the fact that winter usually intervenes before the normal growth is completed, and destroys the terminal bud, leaving the future growth to be made by the axillary buds that have not yet started into vegetation.

This explanation should give us a clue to a rational method of pruning the Raspberry (and Blackberry as well), which has long been a sort of mystery to many growers of these delicious fruits. Why prune them at all? There are two



reasons, one of which has already been suggested. Winter comes on, at least in our climate, before the growth is completed, and usually destroys more or less of the immature and succulent terminal parts. It is better to remove this destroyed portion, because if left it continues to absorb and transmit by evaporation the sap brought up by the living part of the cane, thus robbing in a measure the fruit and foliage. This pruning would naturally be done in the spring as soon as the buds begin to swell. Earlier than this it would be difficult to decide how much to remove; later, the dead portion would already have wrought a part of its mischief.

The other reason for pruning is suggested chiefly, if not wholly, by the convenience of culture. The canes of the Black-Cap Raspberry (*Rubus occidentalis*) grow to such a

length as to greatly interfere with cultivating the plants and gathering the fruit unless they are dwarfed in some way by treatment. By permitting them to grow to their full length, and then cutting them back to a convenient stature, we should remove one-half or more of the fruit-buds, and thus materially reduce the crop. We must prune them in such a way that while we keep them down to a size that is convenient for working among them, we also preserve the flower-buds. To accomplish this we pinch the terminal shoot at the height of two to two and a half feet. This causes the buds in the axils of the leaves to develop into branches, and instead of a single cane six or eight feet in length we have half a dozen branches two feet or less long.

To the beginner it appears almost absurd to pinch a Raspberry-cane at the height of two feet. It seems as if the cane has but just commenced to grow, and that to pinch it at that height will prevent it growing taller. But it should be remembered that there are several nodes at the top of the stem that have not attained their full length, and which will continue to elongate for some days after the tip has been removed. A cane pinched at two feet will attain an ultimate height of three feet, which is sufficient.

It has often been recommended to pinch the branches when they have attained the length of a foot from the main cane. The wisdom of this is quite doubtful, at least in regions of severe winters. The effect of it is to cause axillary buds upon the branches to develop into shoots, and this will take place so late in the season that they have not time to make much growth, and, being immature, they are liable to kill back badly during winter. The result is that the buds that should have remained dormant until spring to furnish the flowers for the crop have been forced into growth in late summer, while the tender buds upon these immature shoots—all that are now left to furnish the crop—have either been killed outright or severely weakened by the winter. It is doubtless, in the majority of cases, better to let the branches from the main cane grow undisturbed until autumn and then cut them back as far as seems desirable at the spring pruning.

The canes of the Red Raspberry (*Rubus strigosus*) do not attain such great length as those of the Black-Cap type, and so do not, as a rule, need pinching in summer. When vigorous growing varieties like the Cuthbert are planted in rich soil the canes sometimes attain an inconvenient height. In such cases they may be pinched like those of the Black-Caps, but the pinching will tend to stimulate the growth of suckers, an evil which needs no encouragement, because it is apt to be excessive in rich soils even without the pinching. It would probably be wiser to substitute a weaker growing variety, or else to remove the plantation to poorer soil.

The reasons given for pruning the Black-Cap type of Raspberries will apply as well to the Blackberry.

University of Wisconsin, Madison. *E. S. Goff.*

Disa grandiflora.

THE York nurseries have long been famed for the cultivation of this superb Orchid, which, when well grown, is very much superior to all other terrestrial species. It is, however, often a failure in English gardens, even when managed by growers of undoubted ability. The treatment which answers so admirably with Messrs. Backhouse, of York, appears simple and within the means of any one possessing a cold-house or frame. At a recent visit there I found over 1,000 spikes of the flowers of this Disa all in a house, or a portion of a house, some twenty yards long. Many of the spikes measured a yard in height, and five flowers on a spike were not infrequent. The house is a low span, running from north to south, with a central path and brick beds about four feet wide. The surface of the bed is about eighteen inches from the glass at the back, and is formed of sandy peat, with large pieces of soft sandstone scattered through it. The depth of the soil is about six inches, below which are clinkers and brick rubble. The best of peat is used, and the plants are always placed against a large piece of sandstone, an important point not to be overlooked. In this they soon establish themselves, sending out runners freely in all directions, so that if allowed to remain undisturbed for two or three years each plant becomes a many-headed tuft. The soil is kept moist, but not excessively so, injury resulting from too free watering even in the case of this plant, which in its South African haunts is often semi-aquatic. The house is shaded all day by a thin canvas blind, and the whole of the roof glass is drawn off both day and night in all favorable weather.

This is the whole secret so far as Messrs. Backhouse can reveal it. On the other hand, some cultivators grow this Disa well by planting it in a mixture of peat, sphagnum and brick rubble or sand. But not even on Table Mountain is it possible to see a more glorious display of flowers than is produced annually in the famous York nurseries.

When we come to examine the plants we find considerable variety in the form and colors of the flowers far beyond anything described as occurring in nature. This variety in cultivated plants is accounted for by the fact that both in Messrs. Backhouse's hands and elsewhere in England seeds have been matured and large numbers of seedlings obtained from them. Sometimes it is possible to obtain strong flowering plants of this Disa in three years from seeds. According to Bolus, Trimen, and others who have studied the habits of *D. grandiflora* at the Cape, wild plants are not known to mature seeds. Trimen stated that he had never found any trace of insect agency in this plant, and Bolus, in his "Orchids of the Cape Peninsula" (1888), says, on this point, "I have never seen a matured seed vessel, nor been able to detect any insect employed in its fertilization. On its native mountains it has a wide range of altitude, grows vigorously in dense masses, or at least several together, being apparently propagated exclusively by the formation of new tubers, and isolated plants (such as might be expected if it seeded freely) are rarely to be seen. Considering the brilliant colors of the flowers these facts are remarkable, and seem to point to the extinction of the insect by which this species was originally fertilized." "Artificial fertilization and selection, although only comparatively recently applied to this species, have already produced remarkable results in the shape of variety. If this plant could be grown with the same ease and success everywhere as it is by Messrs. Backhouse we should probably in time get a race of varieties as diverse in character as Zonal Pelargoniums."

Kew. *W. W.*

A Few Strong-growing Adiantums.—II.

A HANDSOME variety of *Adiantum trapeziforme* is known as Cultratum, and it bears some resemblance to the type, but has smaller pinnules. The young fronds, when developing, are brownish and sometimes tinted with pink, finally turning to dark green with shining black stipes, and frequently attaining a height of three feet or more. This peculiar shading of the young fronds is one characteristic which distinguishes this variety from *A. trapeziforme*, as the latter almost invariably comes up pale green in color. It may be said, however, that the tinting of the young foliage in Adiantums is not always a reliable characteristic to judge by, as differences in exposure as to light or shade may make some difference in the color of some varieties, though not in all.

A. digitatum is another fine species, and, like the preceding, is a native of Brazil and some other portions of South America. It throws up its light green fronds on slender footstalks from one and a half to two feet in height. The fronds are rather irregular in general outline, and are usually three times divided. *A. digitatum* grows best in a warm house temperature, and, as the fronds are rather brittle, it generally requires a few stakes to keep it in form. It is a very distinct species, having pinnules from half an inch to an inch in diameter, and when well grown makes a handsome specimen.

Still another fine Brazilian species is *A. intermedium*, also a stove species, and a notably good one, its massive-looking, dark green, bipinnate fronds, with somewhat woolly stipes, being both ornamental and useful, as they last well when cut and placed in water. While yet small, *A. intermedium* is a good species for window-ferneries, and, as the spores come up freely, it may be readily had for this purpose. This species has as synonyms *A. Brasiliense* and *A. triangulatum*.

A. Wilesianum is a very handsome species from Jamaica, and it is not very common, probably from the fact that it does not produce so many spores as some other species; and the propagation of it thus depends in a measure on division of the crowns. *A. Wilesianum* is somewhat similar in general appearance to *A. cardiochlæna*, though abundantly distinct from the latter. It bears broad fronds that are two feet or more in height and pale green in color. The fronds have shining black stipes which stand up well without support and form an admirable contrast to the delicate coloring of the pinnæ. This species will also be found to grow best in a temperature of about sixty degrees.

A. tetraphyllum gracile is another effective species, the fronds averaging from one to one and a half feet. The young fronds of this species are specially attractive, being bright pink in color, which gradually fades as the frond attains its growth, when it becomes dark green. The fronds of this variety are easily injured by excessive dampness, and it is best therefore to keep the water off the foliage as much as possible, though an abundant supply at the root is necessary. This species,

like so many of the finest of the Maiden-hairs, is of South American origin, being found in Colombia.

A. Aneitense is a fine addition to the genus, made within a few years. It is evergreen, of free and rapid growth, and soon becomes a shapely specimen. Its fronds have some resemblance to those of *A. fulvum*, but are stiffer and harder, and more lasting when cut. This species seeds very freely and the spores germinate quickly, so that it is as easily multiplied as the ever popular *A. cuneatum*. *A. Aneitense* averages about eighteen inches to two feet in height and thrives in a temperature of fifty degrees.

A. curvatum should not be omitted in any good collection, though it has not an excellent reputation for free growth, being often considered difficult to manage. The fronds are large, tripinnate, and very bright green in color, with stipes more or less hairy, the pinnules being curved back to such a degree as to give them almost a sickle shape. This is a stove species and requires heavy shading to encourage its growth, and the soil I have found most satisfactory for it is nothing but rough, fibrous peat, broken into lumps that may be only limited in size by the pot to be used. With this soil and abundant drainage material in the bottom of the pot or pan I have always secured fine plants.

Perhaps it should be said that the Adiantums of more delicate habit have been omitted from these notes, not from any lack of appreciation, but simply because this arbitrary classification is convenient.

Holmesburg, Pa. *W. H. Taplin.*

Cattleya Warneri is one of the best of summer-flowering varieties. Its relation to the Labiata section can easily be perceived in growth and habit. The flowers are large, most of them measuring seven inches in diameter, and the lip is from two to two and a half inches across. The sepals and petals are of a most beautiful rose color, the best varieties having a rich magenta-crimson lip, very finely fringed. We have a few plants with such a lip, but the greater portion of them vary much, both in color and form. In the many plants we have there are very few with a lip of the same shade, every variety being distinct. The durability of the flowers is surprising, some lasting five weeks in perfection. We have had a display of this most magnificent Cattleya for ten weeks, the last flower having just faded.

We grow it in glazed pans about five inches deep and made with holes dotted here and there in them. The glazing seems to help the plants in many respects; for instance, they need no washing, and therefore the roots never get damaged from this process, and they always keep sweet and clean. We fill them within an inch of the top with potsherds, and cover these with a layer of moss; then the plant is firmly potted in a compost of fibre and sphagnum moss and charcoal, taking care to have it well up above the top of the pan.

We never allow our plants to remain dry for any great length of time, as they make their growth in winter and an abundance of roots in summer. They are suspended from the roof, where they get all the light possible, and at all times, except when in flower, when they are put in a more shady place to preserve the flowers as long as possible.

These plants never fail to flower with this treatment, and most of the spikes carry three and four flowers.

Staatsburgh-on-Hudson. *F. Atkins.*

Cytisus scoparius Andreanus.—This beautiful new variety of the common Broom received a first-class certificate of merit at a recent exhibition of the Royal Horticultural Society. I recently saw the plant in bloom at the nurseries of Messrs. Temple & Beard, at Cambridge, and it certainly deserves this honor. In habit the plant resembles the common Broom, to which Linnæus is said to have rendered homage on first seeing it in bloom. In the typical plant the blossoms are clear bright yellow, but in this variety the lower part of the flowers are of a rich crimson-brown, which gives it a very distinct appearance when in bloom. It is said to have been found some five years ago in Normandy, and it has proved perfectly hardy in English gardens, where the typical plant and a white-flowered variety are often cultivated for their beauty as garden shrubs. *Cytisus scoparius* has been found to be perfectly hardy in New Jersey, and this being so, we may reasonably hope that André's variety will eventually be added to the list of beautiful plants for New England gardens; and the list will never be too long to admit novelties of such merit as this one possesses.

Achillea serrata plena.—The old *Achillea ptarmica* has long been valued in gardens for its pretty clusters of double white flowers, and florists often cultivate it on account of the durability of the flowers when cut; but the introduction of the double *Achillea serrata* will almost certainly result in the discarding of *A. ptarmica*. This latter has smaller flowers, and fewer of them, and is of a sprawling habit. A shower of rain bespatters the flowers with mud and renders them useless. *Achillea serrata* grows fully four feet high, and fully three feet of the stem produces useful side branches, with terminal heads of pure white, very double flowers, fully twice the size of those on the older plant. The quantity produced on the stems renders them top-heavy, and a stake is necessary to keep them erect. We have been cutting for the past month from this plant, and shall continue to do so for a week or two more, so that it can be easily seen that the plants hold out well, even in dry weather such as we have recently experienced. It may not be generally known that these Achilleas are readily propagated from the underground shoots or stolons. After flowering in fall the plants may be lifted and placed in soil until January, when the stolons may be taken off, curled around in three-inch pots and covered with soil; they will commence to grow at once, making strong plants for the garden in April, and will flower abundantly during summer. When these double Achilleas get old it is always best to take them up and raise young stock. This treatment will always pay for the trouble involved.

South Lancaster, Mass. *E. O. Orpet.*

Dianthus semperflorens Marguerite.—This interesting Carnation, first offered in seeds and plants this season, is a new strain of Remontants originated by M. Boncharlet Jenne, the well known French horticulturist. Seldom does a floral novelty so fully bear out the claims made for it, for this proves to be a valuable race, with remarkably good points. The plants are rapid, vigorous growers, with good foliage and good habit, of medium height, and may readily be had in bloom in between four and five months from seed. The flowers are of fair size (sometimes of thin texture), often well fringed and fragrant. The seeds are said to produce ninety per cent. of double flowers, but no single ones have appeared among my plants. My flowers are very double, scarlet and rose. It is said there are pure white and striped ones in the race. The plants have every appearance of being of a "perpetual," free-flowering character, though it is not, of course, possible to report on this without further experience. It is scarcely necessary to say that such a race of Carnations is a great gain, enabling every one to readily secure a supply of most valuable flowers for the summer decoration of the garden. The usual "florists' varieties" of Remontants seem to be of not much value for garden purposes, as commercial growers have naturally given their attention to those most serviceable for blooming under glass and producing long stems.

Elizabeth, N. J. *G.*

The Forest.

The Sihlwald.—III.

BEGINNING in rights of usage rather undefined until the opening of the fourteenth century, the rights of property of the free City of Zurich in the Sihlwald extended in 1309 to complete ownership in the forest, and have since been disputed only at the time when, following upon the events of 1798, the free city changed its government to that of a municipality under the confederation. But the rights of the municipality of Zurich in the Sihlwald were definitely confirmed by the so-called Mediation Act of 1803, and the possession of the forest was assured to the city which had so long enjoyed it. Evidences of the care which the burghers bestowed upon it are found in the series of ordinances which, beginning in 1309 with a rule that no forester might cut wood in the Sihlwald—clear proof that a forest-police existed at that early date—continued in unbroken succession to that of 1417, under which the foundation of the present organization was laid, and finally, in 1697, reached the first technical working-plan. It is curious to note as an indication of the view of the nature of its interest in the forest held by the city, that the policy of adding to the public forest-property by purchase, recently inaugurated by the Legislature of the State of New York, was begun by the free City of Zurich nearly two centuries before the discovery of America. It is true, however, that the property has been diminished at times through sales and especially through grants of land for the extinction of servitudes; but the purchase of over four hundred acres during the last fifty years leaves no doubt of the tenacity with which Zurich holds to its forest-inheritance.

The administration of this historical bit of woodland is subject, in common with that of the forests of communes, public

institutions and corporations and private forests necessary for protection, to inspection by the forest-officers of the Canton and the Confederation. Its chief, Forstmeister Ulrich Meister, who holds his office directly from the city, is at the head of a staff which comprises, besides a first assistant with the rank of Oberförster and a variable number of young men who are completing, under his orders, their year of practical work, four trained foresters and a permanent force large enough to carry on the whole lumbering, manufacturing and administrative work of the Sihlwald. And herein lies the chief reason why such an amount of delicate work in the way of silvicultural operations is so cheaply and excellently done. Every wood-chopper in the forest is familiar with the methods of planting and thinning as well as the manner of felling required to ensure the best results, and work which is thought in France to demand the presence of a forest-inspector is here successfully executed by common laborers under the somewhat loose supervision of a forester of the lowest grade.

The financial management, on the other hand, whose avowed object, unlike that of the Forest Administration of the French Government, is to produce the greatest net return in money and not in material, is rigorously centralized and exact. Monthly balances and reports of stock, submitted to Herr Meister and the central office at Zurich and compiled into an annual document at the end of each year, make it easy for the Forstmeister to control the affairs of his forest. Economy as strict and watchful as that of any private enterprise prevails wherever it is consistent with the best interests of the forest; but when its welfare and completeness or the attainment of a scientific silvicultural result is at stake, a wise and open-handed liberality appears. Under this management the Sihlwald gave last year a net return of something over $8 per acre, or a total contribution to the treasury of the city of about $20,000. This sum, large as it is in relation to the area of forest which produced it, promises to be materially increased by the Sihl Valley Railroad, whose construction in the near future will unquestionably enrich the whole valley through which it is to pass. It is not known to me what proportion of this amount, resulting as it does from the sale of fuel and manufactured wood, is derived from the mills as distinct from the forest; but undoubtedly their contribution is of importance. The centre of their activity is, of course, the saw-mill, where ten of the sixty horse-powers, which a turbine takes from the Sihl, go to drive a hand-saw, whose cut, of perfect smoothness and accuracy, is adjustable to the twenty-fifth of an inch and lies in a horizontal plane. The remainder of the power is consumed in the handle factory, whose principal machinery is American, a series of Excelsior machines, circular saws for various purposes, and four extremely simple contrivances for splitting the smaller kinds of firewood. Blacksmiths' and wagon shops —the Sihlwald manufactures nearly everything it uses—and a Boucherie apparatus, for the injection of wood with a solution of copper sulphate by hydrostatic pressure, complete the list. So successful has the injection plant been that telegraph poles, given by its means twice or three times the life they would have had without it, have been exported as far as Rome, and railroad ties, wood pavement, shingles, vine props and a variety of other articles prepared in the same way, have made a very handsome return to the management that was bold enough to undertake their manufacture.

The annual yield of wood, almost half of which is from thinnings alone, reached last year 377,023 cubic feet, an amount which may be taken as slightly above the average. The proportion of fire-wood is generally seventy-four per cent., yielding, however, but sixty-four per cent. of the total revenue. Wages, according to Herr Meister's admirable treatise on the Sihlwald, published in 1883, were at that time at the rate of a little more than half a cent per cubic foot for felling logs, and one dollar and nine cents per cord felled, split and stacked. This represents only from fifty to seventy cents a day; yet the workmen are happy and prosperous, as the statistics of the savings bank and mutual relief fund established among them by Herr Meister go far to show.

With an average stock per acre of 2,860 cubic feet, and the land estimated at $140, the capital value of the Sihlwald is variously stated and decidedly hard to get at. Herr Meister's estimate, given to me last spring, was $500,000. A calculation based on an assumed rate of interest of four per cent. makes it $320,000, whereas three or even two and a half per cent. on investments is here often regarded as sufficient. Exact figures are not obtainable, from the nature of the case.

But the interest of the citizens of Zurich in the Sihlwald is far from being wholly centred in the substantial return which it makes to the city treasury. Their second interest lies in the qualities of a great city park, which it unquestionably presents. It has been the wise policy of Herr Meister to maintain throughout the forest a net-work of well-kept roads and paths, to place occasional benches along them, to keep the beauty of the landscape unharmed, and in general to make the Sihlwald thoroughly and pleasantly accessible. In so doing he has secured its future by demonstrating to the people the reality and value of their ownership.

The question naturally arises whether the multiform advantages to be derived from such a city forest in Switzerland might not be enjoyed in America. The factors which it involves cover too much ground to admit of discussion here, but this much may be briefly said: Were such a forest once in the possession of one of our cities it would not only afford a place of resort whose peaceful freedom would exceed in restful quality all that our present parks can give, but it would combine, under proper management, a steadily increasing revenue to the city, with an educational force and value such as, in the present state of forestry in America, would be amply sufficient to justify its existence. The value of the Sihlwald to the City of Zurich is great and unquestioned, but whether the system might be advantageously transplanted to America, local circumstances must go far to decide.

Nancy, France. *Gifford Pinchot.*

Correspondence.

The Evils of Grafting.

To the Editor of Garden and Forest:

Sir.—Your correspondent, Mr. S. B. Parsons (see page 350), is not quite so logical as usual in his replies to Mr. William Robinson's questions on the above subject. For example, Mr. Parsons tells us that "no intelligent or conscientious nurseryman will think, under ordinary conditions, of grafting a cion upon stock which suckers, or upon stock which is not closely related to it," and yet he fully bears out in his replies to the questions asked the statements that such errors are committed by nurserymen time after time. Mr. Robinson's American Weeping Willows and his dwarf Pyracanthas had both been grafted by nurserymen on coarse-growing stocks, both of which suckered badly, and the Quince stock used in the case of the Pyracantha could scarcely be said to be closely related to the cion. Again, we find even Mr. Parsons himself recording his testimony against grafting or budding, not only in the above two cases, but against the working or budding of Roses, which he does in these pregnant words: "I can see no reason why plants which take root readily from cuttings should be increased by grafting, and I yesterday found myself very impatiently rooting out some Tea Roses which I had imported from England, and which were budded and overgrown by the stock." The fact is that three-fourths of the direct evidence given by Mr. Parsons on page 350 is in perfect agreement with the opinions expressed by Mr. Robinson and held by myself.

Mr. Parsons says that my strictures upon and against grafting may be taken as "a reflection upon a large body of respectable men." I, in writing, like to state a case as definitely as possible, and the aphorism that "grafting is always a makeshift, and very often a fraud," is fully corroborated by Mr. Parsons having to root out his Tea Roses, and also by Mr. Robinson's difficulty with two hardy shrubs, Willow and Firethorn, respecting both of which Mr. Parsons thinks as we do, that they should not be grafted at all!

The fact is there has arisen a tendency to graft everything, as if there were some occult advantage in the mere operation of effecting a more or less perfect union. The old notion that a strong-growing or a vigorous-rooted stock would add strength and vigor to a weakly cion is utterly exploded by modern physiology. The converse of this—namely, the grafting of a vigorous cion upon a more slow-growing, weakly or restrictive stock—may in certain cases conduce to precocious fruiting, but certainly the same result could be more readily obtained by other and more simple cultural methods. An English gardener who visited Florida lately tells us that the grafted Orange-trees there fruit earlier than the seedling-trees, but that the latter are immeasurably superior in health, fertility and longevity. Dr. Wallace, in his chapter on "Acclimatization," in his latest work, "Darwinism," says that the eastern Orange-trees as introduced to Italy and increased by grafting, continued tender and unsatisfactory until the practice of rearing seedlings began. Again, even our greatest English experimenter and cultivator of fruit-trees, Thomas Andrew Knight, began to doubt the efficacy of grafting toward the end of his career.

I still believe that a vast amount of harm has been done to gardening by the fatal facility of grafting plants which, as Mr. Parsons himself shows, could be better and often cheaper

increased by other and more simple methods. It is not a question of what is easiest or cheapest to the nurseryman, but what is best from the general cultivator's point of view.

Grafting, even although it sometimes does afford facilities of increase, also acts indirectly in the very opposite way. For example, if a choice shrub or a fine fruit-tree is worked on a common stock, then the suckers are a source of trouble and loss, but were these desirable plants on their own roots suckers would become a gain. In a word, a plant grafted on a stock standard or half standard high becomes exceedingly difficult of increase except by grafting! This is a point worth bearing in mind in connection with this question, and looking at grafting from all points of view, I am convinced that we should have had better fruit-trees and better and healthier and more prolific varieties in our gardens to-day had grafting never been invented.

As to the delicacy of the Ribston Pippin Apple, I believe I am correct in saying that a sucker of the original seedling tree is still alive in the British garden in which it appeared a century or two ago. When Mr. Parsons talks of "inherent weakness of constitution" as a possibility in this case, it may be so or it may not. To find out if this delicacy and liability to canker is "inherent" or caused by unsuitable stocks, or grafting, Mr. Robinson has gone back to first principles, and has now a healthy little plantation of Ribston Pippins on their own roots, and I think every nurseryman more especially should experiment also in this direction, and while they keep on grafting stock, give the purchaser at least a chance of seeing with his own eyes a few specimens ungrafted. If I write and order a rare shrub or tree ungrafted and it is sent grafted on something else I submit I have a right to return it, just as I have to return a grocer coffee mixed with chicory, when I had expressly ordered pure coffee.

I have frankly stated my opinions on grafting after having seen and experienced a good many of its evils, and I am glad to know that my remarks have led to more careful methods of observation on this and kindred subjects on the part of amateurs and practical gardeners. This is a great gain since the old times when grafting was considered to be an unmixed blessing, and I hope that your Horticultural Experimental Stations in America will take up the subject and carry it further than any individual can possibly do.

In conclusion, I should like to allude to the seedling Apple-trees mentioned by Mr. Parsons as having sprung up over the older settled parts of your country. A glance at Downing's work will show how many of these are now established varieties, indeed most of your best fruits are different from ours. I presume the three Apple-trees mentioned by you on p. 352 are all seedling trees. The context seems to show that the first is so and the last and largest tree, in Washington County, is absolutely stated to be a seedling planted in 1791 or 1792. The trunk where it is smallest girths twelve feet two inches, and the largest branch girths seven feet. I should like to hear of a grafted Apple-tree a century old and of these dimensions.

Botanical Gardens, Trinity College, Dublin. *F. W. Burbidge.*

[American nurserymen are aware that evils result from grafting when it is practiced without judgment, but they do not therefore condemn all grafting; nor will they believe that it is "always a makeshift." Indeed, it has been shown in these columns that grafting serves many useful purposes which cannot be attained so effectively by any other known method. Perhaps more seedling Apple-trees are grown in the United States for the purpose of obtaining new varieties than in all the rest of the world, but Mr. Burbidge does not need to be reminded that these varieties cannot be perpetuated by seed.—ED.]

Periodical Literature.

IN the August number of *The Forum* is an article on "The Possibilities of Agriculture," by Prince Kropotkin, in which he attempts to show the fallacy of Malthus' theory that as population increases the new comers will find no room at the feast of Nature. It is hardly worth while to speculate as to what humanity will do when it begins to feel overcrowded, since that question is so remote that its decision may be left to our descendants. But it may not be out of place to give some of the examples which are used to illustrate the possible increase in the productive power of the earth under intensive methods. Thirty years ago twenty-two bushels of wheat to the acre was considered a fair crop in France, while the present average is, at least, thirty-three bushels on the same land, and in the best soils the crop is considered good only when it yields from forty-three to forty-eight bushels, and occasionally as much as fifty-five and a half bushels to the acre. Experimental farms in central France produce annually over large areas forty-one bushels to the acre, and there are farms in northern France which yield year after year from sixty-five to sixty-eight bushels to the acre, and as much as eighty bushels have been obtained upon limited areas under special care.

At Whitley, England, from 77 to 110 tons of Beets have been grown on an acre, and in France for fourteen consecutive years, on the same lot of land, forty tons of fodder for ensilage—that is, the food of four cows at least—is obtained from an acre. It is somewhat rashly assumed, too, that Mr. Hallett, by a simple selection of grains, will soon obtain a wheat which will yield the yearly supply of bread for a full grown person on a score of square yards! Under high cultivation two and a half tons of hay in Flanders has been considered a fair crop, but when irrigated with pure water these meadows yield three or four times as much—that is, a money return of from $120 to $280 an acre is obtained from soil which formerly yielded only from $16 to $48 worth of poor hay; while below Milan the nearly 22,000 acres irrigated with water from the city sewers yield crops of from eight to ten tons of hay as a rule, while occasionally some separate meadow will yield the enormous amount of eighteen tons of hay to the acre—that is, the food of more than three cows for a year.

Proceeding to examples in horticulture it is stated that the Paris market-gardeners are able to pay $126 rent to the acre and make a good living. What attracts market-gardening to the vicinity of great cities is the stable manure, and the value of this is not so much due to the richness which it adds to the soil as to the increased temperature which it supplies by fermentation. Early vegetables pay best and the soil as well as the air must be warm. But it is plain that this warmth can be obtained more easily by pipe-heating, so that a few years ago the Paris gardeners began to heat the soil by means of portable hot-water pipes. It is also stated here that the original fertility of the soil is of little consequence to the best gardeners, since the soil is always actually made, so that it is now a usual stipulation in the renting contracts that the gardener may carry away his soil, and when he moves to another plot he carries it away with his frames and water pipes and other belongings.

The Island of Jersey is a land of open-field culture, and yet it nourishes a population of two inhabitants to each acre and the early Potato crop returns more than $300 to each acre planted. Besides this, cereals and grass are grown for cattle, and more than one cow is supported on each acre of grass-land. In addition to the enormous amount of dairy products exported, 1,500 milch cows a year are sent away, so that an agricultural produce to the amount of $250 an acre of the entire surface of the island, including the rocks, is obtained.

The Island of Guernsey nourishes 1,300 souls to each square mile of soil, which is less productive than that of Jersey, but the land is given over to market-gardening and greenhouse culture. These greenhouses are seen all over the fields and on the steep slopes of the hills, the origin of this new departure being the production of grapes, which was started some thirty years ago. Five hundred tons of grapes are annually exported now, and yet the most important crops under glass are ordinary vegetables like Tomatoes, Potatoes, Carrots, etc. Three-fourths of an acre under glass and heated for three months in the spring yields some eight tons of Tomatoes and 200 pounds of Beans as a first crop in April and May, to be followed by two crops more in summer and autumn. In simple glass and plank shelters Pea plants cover walls in places for a length of a quarter of a mile and potatoes are dug in April at the rate of five bushels to twenty-one feet square.

Mr. Bashford, in the Island of Jersey, has vineries which cover thirteen acres, and the money returns from them greatly exceed those of an ordinary English farm of 1,300 acres. The last year's crops were twenty-five tons of grapes, eighty tons of tomatoes, thirty tons of potatoes, six tons of beans, (the last three April-crops), to say nothing of subsidiary ones. The cost of the houses is only $2.34 to the square yard without taking into account the pipes, and all the work is done by thirty-six men. A thousand loads of coke and coal are all the fuel that is required. Besides these well constructed greenhouses, simple shelters which cost only ten cents a square foot often help to raise surprising crops ready for sale by the end of April. Altogether the glass house is no longer a luxury, and grapes will soon cost in England no more than the few pence they cost on the Rhine, because the labor in growing grapes in Northumberland, where a ton of coal costs but three shillings at the mouth of the pit, is much less than the

work which has to be done in carrying the soil up the cliffs of the Rhine to the height of several hundred feet and in attending to the vines there.

Prince Kropotkin gives no forecast as to the possible productive power of the earth when organic manures—that is, special liquids containing special microbes—are used in addition to chemical manures, and when science has discovered some economical way of obtaining nitrogenous fertilizers from the limitless supply of nitrogen in the atmosphere which surrounds the earth. But he makes a suggestion to American readers which it is worth while to reproduce:

"Suppose that instead of building at the Chicago Exhibition an Eiffel tower 1,000 feet high, a number of intelligent men should cover with glass houses, say, a hundred acres or more. Suppose they devote forty acres to art—I mean to flowers and to tropical vegetation—and the remaining sixty acres to the plainest vegetables and fruits, such as will be consumed by the ton during the exhibition. It will not cost one-tenth part of what the tower would cost, but it is sure to repay the expense. And—what is infinitely more important—it will make a complete revolution in the ideas of mankind as to what the soil is, and how it must be treated. It will stimulate invention in a field where it is most required; and it will be a new departure for the coming century."

Notes.

We have received from Messrs. Siebrecht & Wadley a flower of Gloxinia which is pure white, with no color-markings whatever. It is from one of their seedling plants and it seems to have great substance.

The annual Gladiolus show at the stores of Peter Henderson & Co. is now in progress and it is quite as interesting as it has been in former years. Besides the Gladiolus there is a varied display of French Cannas, Liliés and other summer blooming plants, with fancy Caladiums, Ferns and a large collection of well grown Palms. A tank full of choice aquatics seems to be the principal attraction for many of the visitors. The exhibition will remain open through Friday.

In the forest behind the Castle of Mereworth, Maidstone, stands a Beech-tree whose age must be more than 250 years, and which shows no indications of decay. The bole at three feet from the ground measures seventeen feet in circumference, and it only commences to branch at a height of twenty-two feet. The diameter of the crown is thirty yards. Dates cut in the bark about the middle of the last century, still clear and easily deciphered, show that it was a big tree then, and that it has expanded but little since.

An old periodical says of the poet Wordsworth: "He is fond of the Hollyhock, a partiality scarcely deserved by the flower, but which marks the simplicity of his tastes. He had made a long avenue of them of all colors, from the crimson-brown to rose, straw color and white, and pleased himself with having made proselytes to a liking for them among his neighbors." This was long before the days of the "æsthete" and his love for stiff "decorative" flowers. To-day a Hollyhock would not be called undeserving even of a poet's preference.

The *Gardeners' Chronicle*, in speaking of some flowers of *Fuchsia triphylla* which had been received from Mr. W. Dean, adds, "This old species, remarkable for its compact bushy habit, dark foliage, claret colored on the under surface, and its terminal racemes of orange-scarlet flowers, would make a good market plant. Cuttings struck last autumn, and grown on in an intermediate house in ordinary potting mould, are now flowering freely in the Birmingham Botanic Garden." In a recent description of these Birmingham Gardens in this journal it was stated that this plant there formed perfect specimens two feet through, and completely covered with clusters of long-tubed flowers. Since this Fuchsia was rediscovered by Mr. Thomas Hogg as long ago as 1873, it seems to have been slow in securing the attention it deserves.

In his article on the Yosemite, in the August number of *The Century*, John Muir speaks of the forest of Big Trees in Tulare County, which Secretary Noble has been asked to save from destruction: "But the finest block of Sequoia in the entire belt is on the north fork of the Tule River. In the northern group there are comparatively few young trees or saplings. But here for every old, storm-stricken giant there is one or more in all the glory of prime, and for each of these there are many young trees and crowds of eager, hopeful saplings growing heartily everywhere—on moraines, along watercourses and in the deep alluvium of meadows—seemingly in hot pursuit of eternal life." That is, this is a true forest, with all the elements of continuous forest-life, and not merely a collection of ancient trees with no hope of a succession.

To illustrate the way in which we waste our forest-resources, Mr. Fernow writes in *Kate Field's Washington:* The poor state of Prussia, with a population nearly twelve times as dense as ours, must husband her resources closely to supply her wants. A first-class forest-administration is therefore among her institutions; and from its carefully collected experience we learn that forty-one cubic feet per acre per year is all the wood crop she can raise Of this, forty per cent. is brush and such inferior-sized wood as no American would use. We may, then, accept an annual production of twenty-four cubic feet of wood per acre, over our whole forest-domain, as a reasonably large average figure. That is to say, there would grow only twelve billion feet, where we cut twenty billion, and eat into our forest-capital at the rate of eight billion feet yearly. Thus in progressive ratio are we despoiling our children's heritage.

The announcement of the death of John Ralfs at Penzance, England, on July 14th, at the advanced age of eighty-three, recalls the life and work of one who was formerly prominent in the botanical world, although it is now many years since he published anything on botany. His profession was that of medicine, and in his early days he practiced at Shoreditch. In 1839 he published a treatise on British Flowering Plants and Ferns; but his principal studies were on Desmids and Diatoms, and other low forms of Algæ, and in this field he was a recognized authority. He was the author of a considerable number of papers, especially on Desmids, most of which appeared in the *Annals* and *Magazine of Natural History;* but the work on which his fame now rests is "The British Desmidiæ," beautifully illustrated by Edward Jenner, which was published in 1848. This excellent work will always remain a classic on the subject. It is especially important to students of North American Desmids, since it includes the descriptions and figures of a considerable number of species collected by the late Professor J. W. Bailey, of West Point, by whom material was sent to Ralfs.

Experiments to test the relative value of steam and hot water for heating were conducted last winter at the Agricultural College of Michigan, and the tests indicate that for small greenhouses hot water is more economical and more satisfactory than steam. In the month of December the steam-house had an average temperature one and a half degrees lower than that of the hot-water-house, although five tons of coal were consumed in the former as often as four tons were consumed in the latter. Maximum and minimum thermometers also indicated a greater variation of temperature in the steam-house than in the other. The records for other months were similar. During the month of April the two systems were compared in a different manner. The same amounts of coal were supplied to each house, and the result was that the hot-water-house was kept at a temperature seven degrees higher than that of the steam-heated house. Of course it cannot be proved that the most effective system of utilizing steam heat was used, and another kind of heater might reverse these results. But, on the other hand, it may be said that this test only corroborates the experiments made by Professor Maynard at Amherst.

Every reader of English novels knows of the "pot-pourri" made from rose-leaves which old ladies keep in china jars to perfume their drawing-rooms. The following recipe, recently given in the Detroit *Tribune*, may therefore be of interest: "Gather the roses in dry weather, remove the petals, and to a peck of fresh leaves add a good handful of salt. Let this remain five days, stirring up the leaves every day. When they appear moist add three ounces of bruised allspice and one ounce of cinnamon stick bruised. After this stands for a week, stirred daily from the bottom, put into a permanent jar one ounce of allspice, and add the stock layer by layer. Sprinkle between these layers one ounce each of cloves and cinnamon, two nutmegs, all coarsely powdered, some ginger-root sliced thin, half an ounce of anise-seed bruised, ten grains of fine musk, half a pound of freshly dried lavender flowers, two ounces of powdered orris-root and *ad libitum* cologne, rose or orange flower water, orange or lemon peel. Freshly dried violets, tuberoses, clove pinks, or any other scented flowers may be added. Fine extract of any kind will enhance the fragrant odor, while fresh rose leaves, salt and allspice, made as at first, may be added when convenient. Stir the jar occasionally, leaving it closed except when the perfume is wished to odorize the room." Thin bags filled with this "pot-pourri" and placed in bureau drawers or linen presses impart a delightful fragrance to their contents.